

Patent Application of  
Jeff Larsen and Joe Boud  
for

TITLE: Backpack for Carrying a Bicycle

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**CROSS REFERENCE TO RELATED APPLICATIONS:** Not Applicable

**FEDERALLY SPONSORED RESEARCH:** Not Applicable

**SEQUENCE LISTING OR PROGRAM:** Not Applicable

10 **TECHNICAL FIELD OF THE INVENTION**

This patent generally relates to the field of biking and backpacking. The present invention is a backpack adapted for carrying a bicycle that enables a user to hike or backpack into a remote location, over rough terrain, or city subway system and then dismount the bike 15 and ride on the bicycle. The present invention enables a user to quickly and easily secure a bicycle to the backpack for transportation when it is undesirable for the user to ride on the bicycle.

**BACKGROUND OF THE INVENTION**

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Mountain climbers and hikers have been utilizing backpacks in a variety of forms for many years. Several U.S. Patents have issued teaching the use of a backpack for transporting such things as folding chairs, boots, fishing rods, and even chainsaws. U.S. Patent 5,570,829

issued on 11/05/1996 to Harrison shows a backpack comprising front and rear members, a connecting device to form an internal cavity with a fastening device for storing and securing a foldable chair. U.S. Patent 4,972,981 issued on 11/27/1990 to Gex discloses a backpack for carrying folding chairs that utilizes an adjustable enveloping structure that can accommodate  
5 different sizes and numbers of chairs.

Many other backpack designs have been created for easier transport of boots (U.S. Patent 5,456,353 issued on 10/10/1995 to Challoner), fishing rods (U.S. Patent 5,975,393 issued on 11/02/1999 to Bellamy), hunting bow (U.S. Patent 6,290,114 issued on 9/18/2001 to Berberian), and a chain saw (U.S. Patent issued on 12/17/1985 to Fullmer). The present  
10 invention teaches the use of a backpack system that enables a user to transport a bicycle in a more efficient and easier manner. U.S. Patent 4,448,437 issued on 5/15/1984 to Montague teaches a foldable bicycle that has separate front and rear frames coupled to each other. The bicycle uses standard components to form the drive, brake, and steering assemblies. In the folded state, the bicycle may be backpacked using available straps and webs that are attached  
15 to the front frame.

The invention disclosed in U.S. Patent 4,448,437 issued to Montague has many deficiencies that the present invention cures and eliminates. The present invention does not utilize a folding bicycle frame, but is meant to be used with any standard bicycle of any size. The prior art for transporting a bicycle in a backpack configuration utilizes a specialized  
20 bicycle comprising a foldable frame. This foldable frame presents many issues of strength and durability of the bicycle when in use. The present invention evolved from the need for mountain bikers and downhill riders who struggled to carry their bikes into terrain that they wished to ride down or out of. The bikes required for this type of exercise undergo extreme

forces and must be able to withstand a tremendous amount of stress to the frame and other components. A foldable bicycle will not be able to withstand the stress from such activities and is not desirable for this application. The present invention cures this problem by creating a backpack that a user can attach any bicycle desired and easily transport over any terrain.

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## SUMMARY

The present invention is a durable, lightweight backpack that allows its user to comfortably carry a bicycle over long distances and varied terrain. The back is constructed of 10 a lightweight frame and is fully adjustable to fit any size of user. The backpack includes a detachable backpack, lumbar fanny pack for added convenience, and a hydration system on a compact external frame. Once the wheels and inside pedal of a bicycle are removed the bicycle frame is mounted on the pack, the wheels are attached to the frame of the bike and the 15 pedal is stored away. The backpack also contains additional space for personal items such as shoes, clothing, food, and water.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates the bicycle resting on a bare backpack frame;

20 Fig. 2 illustrates the side run bars of the frame pack in one embodiment;

Figs. 3 (a), (b), and (c) illustrate the bottom portion of the backpack frame in one embodiment;;

Fig. 4 illustrates the shape of the bottom brace in one embodiment;

- Fig. 5 illustrates the top portion of the backpack frame in one embodiment;
- Fig. 6 illustrates the shape of the top brace in one embodiment;;
- Fig. 7 illustrates the shape of the middle brace in one embodiment;
- Fig. 8 illustrates the strapping method used to secure a bicycle to the frame;
- 5 Fig. 9 illustrates the attachment of the bicycle wheels to the backpack for use;
- Fig. 10 illustrates the complete external frame of the backpack system in one embodiment;;
- Fig. 11 illustrates the complete external frame of the backpack system of another embodiment;
- Fig. 12 illustrates a front view of the backpack frame with the hydration system, straps, and
- 10 bags mounted thereon;
- Fig. 13 illustrates a back view of the backpack frame with the hydration system, straps, and bags mounted thereon.

#### DETAILED DESCRIPTION OF THE INVENTION

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Fig. 1 illustrates the basic design of the backpack system with a bicycle mounted on the frame ready for transport (100). The backpack frame (101) is comprises a bottom portion (102), bottom brace (103), top portion (104), top brace (105), middle brace (106) and two side run bars (107 & 108) position on opposing sides to form the frame of the backpack (101).

20 The bike frame (109) is place on the top portion of the backpack frame (104) and is secured by a strapping system illustrated in detail in a latter figure.

Now referring to Fig. 2 the side run bars of the backpack frame are illustrated. Each side run bar (108) consists of three sections, the top portion (201) is straight and is designed to

rest flat against the users back the provides for support and easier ergonomics in carrying the back. The middle portion (202) begins with transitional radial bend (203) at the end of the top portion (201). The radial transition is made at a 15 degree angle (204) away from the side run bar surface the contacts the user (205) and extends for a predetermined length. The middle  
5 portion is necessary to follow the contour of the human body from the upper and middle back regions, to the lower back, and finally over the gluteus. The middle portion (202) then terminates at predetermined length to accommodate most individuals of various height and weight and another radial bend (206) is used to return the side run bar (108) to bottom portion (207) that is in parallel with the top portion (201). The bottom top and middle portions can be  
10 of any desired length base on a users height and weight.

Figs. 3 (a), (b), and (c) illustrate the bottom portion of the backpack frame. Referring to Fig. 3(a) an overhead view of the bottom portion (102) is shown. The bottom portion (102) is essentially a horse shoe design consisting of a single bar (300) with two radial bends (301 & 302) creating a horseshoe shape with two equal side portion (303 & 304) and a center portion (305) between the two side portions (303 & 304). The bottom portion's sides (303 & 304) can be made any distance apart as desired to accommodate varying user sizes. The width of the side portions (303 & 304) determines the width of the backpack frame. Now referring to Fig. 3(b) a side view of a bottom portion's side (306) is shown. The side portion (306) ends with another radial bend (308) the places the open end of the tube (307) perpendicular to the side (303 & 304) and middle portion (305) of the frame bottom (102). The tube openings (309 & 310) accept a side run bar (311) to create the frame of the backpack. Fig. 3(c) provides a frontal view of the frame bottom (102) and the end portions (312 & 313) receiving side run bars (314 & 315).

Now referring to Fig. 4 the shape of the bottom brace is shown. The bottom brace (400) is connected to the bottom portion of the frame at the radial bends (308) previously shown in Fig. 3(b) and is connected in such an orientation that it forms a single bottom plane of the backpack frame with the lower portion (102). The bottom brace is essentially a  
5 triangular shape consisting of one middle bend (401) resulting in two equal side portions (402 & 403) with ends (404 & 405) that engage the bottom portion (102).

Fig. 5 illustrates the top portion (500) of the backpack frame. The top portion (500) is essentially a horse shoe design consisting of a single bar (501) with two radial bends (501 & 502) creating a horseshoe shape with two equal side portion (503 & 504) and a center portion  
10 (505) between the two side portions (503 & 504). The bottom and top portion's sides can be made any distance apart as desired to accommodate varying user sizes. The width of these side portions determines the width of the backpack frame.

Now referring to Fig. 6 the shape of the top brace is shown. The top brace (600) is connected to the top portion of the frame and the side run bars of the backpack frame as  
15 previously shown in Fig. 1 and is connected in such an orientation that it forms a single plane of the backpack frame with the top portion (104). The top brace is essentially a triangular shape consisting of one middle bend (601) resulting in two equal side portions (602 & 603) with ends (604 & 605) that engage the side run bars. The top brace (600) also contains multiple gun-drilled holes (606, 607, 608, and 609) that are utilized for connecting a shoulder  
20 strap and provide for multiple strap mounting positions to accommodate users of various sizes.

Fig. 7 illustrates the shape of the middle brace. The middle brace (700) is connected to the side run bars of the backpack frame as previously shown in Fig. 1 and is connected in

such an orientation that it extends outward from the plane of the backpack frame the rests against a users back. The middle brace consists of two bends (701 & 702) resulting in a middle portion (705) and two equal side portions (703 & 704) with ends (706 & 707) that engage the side run bars. The width of the middle brace is equal to that of the frame pack as  
5 determined by the widths of the top and bottom portions that can be modified to fit people of varying body types, height and weight.

Fig. 8 illustrates the attaching means for securing a bicycle to the backpack frame. The attaching means are located on the side portions (503 & 504) of the top portion of the backpack frame previously shown in Fig. 5. The securing means consists of a flexible plastic strapping device that is common found in the prior art and is used on many other transporting applications such as bicycle racks which are attached to cars that enable a bicycle to be secured and transported. The securing means consists of a base portion (801) that with an opening that allows is to be place over a metal or plastic tube. The base portion also consists of a long strap (802) that contains notches or openings (803) which enable it to be placed and  
10 secured over an attaching portion (804) also found on the base portion (801). Once the device is attached to a tube and a bicycle is place in position the strap (802) is folded over the bicycle frame and connected to the attaching portion (804) utilizing one of the many openings (803).  
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Now referring back to Fig. 9 the wheels are attached to the backpack frame or the bicycle frame utilizing two industrial strength twist ties. First the bicycle frame (900) is  
20 placed against on the backpack frame (901). Next the bag system (902) utilized by the backpack consists of two separate bags, an upper bag (903) and a lower bag (904) that are connected by snap connectors (905 & 906) are unhooked. With the bags unhooked from each other the bicycle wheels (907 & 908) can be place behind the bags (905 & 906) and against

the backpack and bicycle frames. Then twist ties (909 & 910) are placed around the bicycle tires' rims and either the frame of the backpack or the bicycle frame, which ever is more convenient depending on the size of the bicycle and the users preference. Finally, the upper and lower bags (903 & 904) are placed over the bicycle wheels (907 & 908) and snapped 5 together to create an enclosed area between the bags (903 & 904) and the frames (900 & 901) that creates a tight fit for securing the wheels between the bags (903 & 904) and the frames (900 & 901).

Now referring to Fig. 10 one view of the complete external backpack frame (1000) is shown. The frame comprises side run bars (1001), a lower portion (1001) and upper portion 10 (1002) and a middle brace (1003). In another embodiment illustrated in Fig. 11 the backpack frame comprises side run bars (1101), a top portion (1102) and a middle brace (1103). In this embodiment the bottom portion has been eliminated and the top portion may either remain as previously described or consists of two straight bars only sufficient for the mounting of a frame securing apparatus (1104).

15 Now referring to Fig. 12 the backpack frame (1200) comprises a strapping system (1201) that is mounted to the top portion (1202) and side run bars (1203). Additionally, in the preferred embodiment there is a back support (1204) and lower securing means (1205) that may be secured around the users waist to assist securing the backpack to a user in addition to the straps systems (1201). A hydration system (1206) is mounted to the side run bars and 20 (1203) and top portion (1202) allowing the user easy access to the drinking tube (1207).

With respect to Fig. 13 the backside of the backpack frame (1300) has attached, in the preferred embodiment a first outer storage compartment (1301) mounted on top of the top portion (1302), a second storage compartment (1303) mounted to the side run bars (1304) and

a third storage compartment (1305) mounted to the side run bars (1304) and mounted on top of the lower portion (1306). The second storage compartment (1303) and the third storage compartment (1305) releasably engaged such that they can be connected together to secure items between them and the backpack frame in a connected orientation or when released the 5 storage compartments (1303 & 1305) can be moved to allow insertion or removal of bicycle wheels.

Storage compartment designs can be modified to fit a particular users desirable storage requirement. For example a hiker would most likely use it in the present embodiment or with just one long storage compartment. An adventure racer might use a long storage compartment 10 but also have smaller item storage compartments on the shoulder straps for food, tools, or GPS. A commuter model could have a messenger bag with a large storage compartment that you can put the entire backpack inside and carry it into an office building. Storage compartments on a touring model would also convert into panniers. All storage containers or bags are designed to be interchangeable so a user must only buy one backpack frame in one 15 form, but could convert it by adding or removing storage compartments at a later time to place the backpack into a different configuration as described above or a personalized combination.

Another embodiment of the backpack frame could be the replacement of the top brace used to support the bike with two simple tubes for mounting the securing apparatus, effectively utilizing the same brace absent the center portion previously discussed.

20 Although the description above contains various specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the

examples given.